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INTERNATIONAL RECORD OF MEDICINE

THE RATIONALE FOR THE USE OF HORMONES IN THE TREATMENT OF DISEASES OF THE LIVER — *Louis Pelner and Samuel Waldman*

PAN AMERICAN MEDICAL WOMAN'S JOURNAL

ESSENTIAL NUTRITION IN GERIATRICS — *W. Coda Martin*

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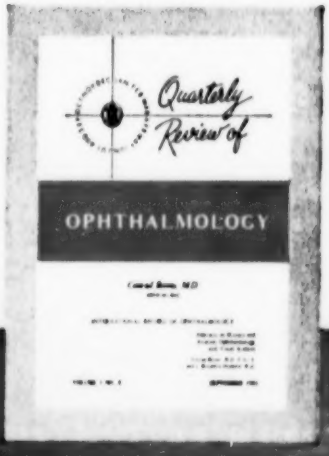
in this issue

QUARTERLY REVIEW OF OPHTHALMOLOGY

Conrad Berens, M.D.
Editor-in-chief



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Louis Pelner and Samuel Waldman

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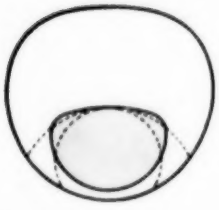

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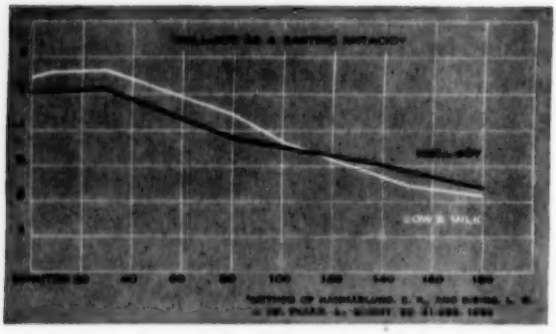

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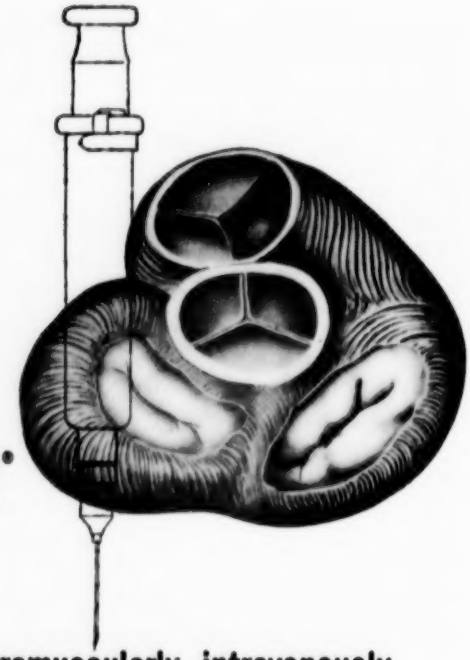

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The Rationale for the Use of Hormones in the Treatment of Diseases of the Liver

Louis Pelner, M. D., F.A.C.A.
Samuel Waldman, M.D., F.A.C.P.

BROOKLYN, N. Y.

Until recent years, cirrhosis of the liver was considered as the end stage of pathological destruction of the liver and therefore the condition was thought to be irreversible. During the last decade, largely through the work of Patek, this ominous prognosis has been changed for the better. He gave his patients high-protein, high-carbohydrate, vitamin-rich diets with added B complex factors. This produced some improvement in many patients and occasionally caused a spectacular remission.

Recently it has become evident that there is a hormonal dysfunction in cirrhosis of the liver, specifically an overabundance of estrogen and a lack of adrenocortical hormone.[1] Although many of the symptoms of cirrhosis of the liver can be explained and treated on a hormonal basis, it must be stressed that this is only one facet of the problem, and perhaps not even the most important. It is the purpose of this paper to show the rationale for the use of hormone therapy in cirrhosis of the liver and also in certain acute diseases of the liver.

INCREASED ACCUMULATION OF ESTROGENIC HORMONE

There is a great deal of evidence available that the normal liver inactivates estrogens in both male and female and prevents their accumulation in the body. Clinically, certain classical signs of estrogen overabundance are present in patients with liver disease, such as cirrhosis of the liver: gynecomastia, atrophy of the testicles, prostatic hypertrophy, certain abnormalities of hair growth and menstrual disturbances in females. Atrophy of the testicles and decreased libido with impotence is a usual finding in chronic liver disease. Bean[2] has stated that these may be the presenting symptoms of cirrhosis of the liver. It was demonstrated by Morrione,[3] both in men and in animals, that estrogen overabundance causes testicular atrophy in chronic liver disease.

Rolleston[4] long ago showed that abnormalities of the menses were present in liver disease. Women who have passed the menopause and later develop cirrhosis of the liver subsequently may again begin to menstruate.

There is much evidence available to show that the normal liver can inactivate estrogens. This was first demonstrated by Zondek,[5] who later showed that it was the hepatic cell that did the inactivating, rather than the Kupffer cell. Estrogens can even be inactivated *in vitro* by liver extract. The Biskinds[6] have shown that vitamin B-complex is essential to the inactivation of estrogen by the liver.

It has been shown that the liver is the site of inactivation of both estrogens and androgens.[1] Because of the obvious overabundance of estrogens in liver disease there must be unequal destruction of the steroid hormones by the damaged liver. It must be that a healthier liver is required to destroy estrogen than is required for androgens.

There have been attempts to treat cirrhosis of the liver with testosterone, based on the evidences of estrogen overabundance as noted above. Rosenak, Moser and Kilgore[7] reported improvement beyond that attained with the usual dietary and vitamin therapy. In some of their patients, there was improvement in strength, appetite and libido; in some they also noted a delayed reaccumulation of ascites and edema. In two of their patients, there was an improvement in the liver function tests after testosterone was added to the previous treatment. In a disease so unpredictable as cirrhosis of the liver, it is difficult to assess the value of any one therapeutic substance, but it seemed that testosterone added something of value. The dosage used was 25 to 100 mg. three times a week.

On a theoretical basis, especially because the liver has to perform additional work in detoxifying all hormones, we feel that the smaller dose would be advantageous.

EVIDENCE FOR A DEPLETION OF ADRENAL CORTEX ACTIVITY IN CIRRHOSIS

There is much circumstantial evidence pointing to an adrenal cortex depletion in cirrhosis of the liver. However, the evidence is meager that adrenal insufficiency is a primary defect. Thus the hormone has adjunctive value, rather than specific value. Both male and female patients with cirrhosis have decreased axillary hair. This is theoretically thought to be due to diminished cortical activity. Lloyd and Williams[1] showed that the adrenal glands in patients with cirrhosis have a very low content of lipoid material as compared to the adrenal glands of normal persons. In addition, the few quantitative estimations of the cholesterol content of the adrenal glands in patients with cirrhosis showed that the values were lower than in patients who died from other chronic illnesses.

It is generally believed that the adrenal cortex has androgenic activity, which can be measured by the 17-ketosteroid excretion in the urine. In normal males, the 17-ketosteroid excretion is about 12 mg. per day and in females it is about 8 mg. per day. Eisenberg and his colleagues[8] found the 17-ketosteroid excretion in patients with cirrhosis of the liver to vary between 1.0 and 4.0 mg. per day. Although testicular depression in the male cirrhotic could account for a small drop, deficiency of adrenal androgens must account for the marked diminution in the excretion in these patients. This appears to be good circumstantial evidence of a depression of adrenocortical function in cirrhosis of the liver.

The relative lymphocytosis and eosinophilia that is often found in patients with cirrhosis of the liver might possibly be the result of reduced adrenocortical secretion.[9] It is well-known that a lymphocytosis and eosinophilia are usual findings in Addison's disease. Some of the patients with cirrhosis are actually pigmented and present a picture of pseudo-Addison's disease with their associated weakness and marked susceptibility to infection.

Since the adrenocortical insufficiency is probably not of a primary nature, it is interesting to speculate on its possible cause. Tepperman[10] suggested that the inability of a damaged liver to esterify cholesterol might be the important factor, since the cholesterol esters are supposed to be the precursors of the adrenocortical hormones. However, Eisenberg and his colleagues[8] found no relationship between the 17-ketosteroid excretion and the cholesterol ester level in the blood.

Hamblen, Pattee and Cuyler[11] felt that the adrenal insufficiency was due to the presence of a high level of unoxidized and undestroyed estrogen in the blood. They found that estrogen administration was followed by a decreased urinary 17-ketosteroid excretion.

Part of the estrogen in each sex is probably secreted by the adrenal gland. Although the total amount of estrogen that is formed in a patient with cirrhosis is probably less than is formed in a normal individual, the ability of the liver to inactivate the estrogen present is so poor that the unconjugated, biologically active estrogen content is above normal. This free estrogen excess results in the glandular characteristics noted above.

Lloyd and Williams[10] explain the adrenal insufficiency in patients with cirrhosis in the following manner. The stimulation to the release from the pituitary of luteinizing hormone and corticotrophic hormone is a high circulating estrogen content. However, this must be inactivated and oxidized, which ability is decreased in patients with cirrhosis. This decrease in inactive oxidation products of estrogen leads, therefore, to a decreased release from the pituitary gland of luteinizing hormone and ACTH. This, in turn, would result in menstrual abnormalities, decreased activity of the Leydig cells, decreased adrenocortical function with loss of axillary hair, diminished 17-ketosteroid excretion and susceptibility to infection.

Last, but not least, our findings of a positive Robinson-Kepler-Power water test in patients with cirrhosis, a finding which has long been known and now confirmed, is further evidence of adrenocortical deficiency in liver disease.[12]

THE DISTURBANCE OF WATER BALANCE IN PATIENTS WITH CIRRHOSIS OF THE LIVER

It has long been known that patients with cirrhosis of the liver and ascites have an oliguria. The actual rate of urine excretion in patients with cirrhosis following standard doses of water has been measured by several investigators, notably by Ralli and her co-workers,[13] and was found to be retarded, i.e., only a limited amount of the ingested water is excreted over a period of time. Ralli and her co-worker[13] have also shown that the same alteration in the rate of urine flow occurs in patients without ascites, as well as in patients with fatty livers or with hepatitis. It has been shown to occur also in rats fed high fat diets, before the liver damage has advanced to cirrhosis, i.e., before significant changes in portal pressure could possibly have taken

place.[14] Ralli standardized her test as follows: 1500 cc. of water is given by mouth. Normal subjects excrete 50 per cent of the ingested water within 100 minutes. Patients with cirrhosis showed a delayed excretion and some with ascites did not excrete 50 per cent of the ingested water before 240 minutes.

The anti-diuretic hormone of the posterior pituitary probably mediates the retarded urinary excretion and presumptive water retention. This is a known function of the anti-diuretic hormone and Ralli[16] has found an increased urinary excretion of an anti-diuretic substance in patients with cirrhosis. Presumably, the preponderance of the anti-diuretic hormone is due to poor inactivation by a damaged liver.

A similar retarded excretion of ingested water is found in Addison's disease. We used in our research the Robinson-Kepler-Power water test for Addison's disease[16] and found a retarded excretion in nearly every patient with cirrhosis of the liver.

THE DIURETIC ACTION OF THE ADRENOCORTICAL HORMONES[17]

When water is given by any route, the normal diuretic response depends on the action of the cortical hormones. Adrenalectomized animals cannot excrete water at a normal rate. The water excretion of intact animals, even if dehydrated, is increased when they are given adrenocortical hormones.

Two actions of the cortical hormones are considered to be responsible for their effects on water diuresis: (1) They are necessary for the maintenance of a normal renal glomerular filtration rate and normal renal plasma flow; and (2) The adrenocortical hormones inhibit the renal tubular reabsorption of water. Tubular reabsorption of water exceeds normal in adrenal insufficiency.

There is an antagonistic relationship between the adrenocortical hormones and the posterior pituitary anti-diuretic hormone (ADH). The probable cause of the increased tubular reabsorption of water in adrenal insufficiency is due to an accumulation of circulating ADH. Increased amounts of antidiuretic substances (probably ADH) have been found in adrenalectomized animals, Addisonian patients and in cirrhosis of the liver (Ralli[13]). Also when the diuretic cortical hormones are absent, there is an increased sensitivity to ADH. As mentioned above, in cirrhosis of the liver, there are increased amounts of circulating anti-diuretic substances (probably ADH) present due to lack of inactivation by a damaged liver. The physiological antagonist to the anti-diuretic substances is the adrenocortical hormones.

The adrenocortical hormones increases urinary output in patients with cirrhosis by antagonizing anti-diuretic substances (probably ADH), and thus may reduce ascitic fluid production.

We have had excellent results in liver disease with Lipo-adrenal cortex extract (Upjohn[12]). This has been especially true for patients with severe acute liver disease. Lipo-adrenal cortex contains, among other adrenal hormones, a small quantity of cortisone (1 mg. per cc.). The dosage of cortisone used today in clinical medicine is often several hundred times this small quantity. Such large quantities of steroid hormone puts a great strain on the liver during the process of detoxification.

In three patients with hepatic coma, treated satisfactorily, the dosage of Lipo-adrenal cortex extract was 5 cc. per day intramuscularly, in addition to 10 cc. of

aqueous adrenal cortex hormone added to the glucose infusion. In the cases of hepatic coma there is usually a severe oliguria (lower nephron nephrosis or hepatorenal syndrome) and if this is present, no more than 1000 cc. of fluid, plus an additional amount equal to the amount of urine passed, may be safely administered. This fluid should preferably be 10 per cent glucose in distilled water, plus added vitamins. After diuresis has begun, salt and other metabolites, such as calcium, should be added. The dose of Lipo-adrenal cortex should be reduced to 2 cc. three times weekly. It has been our custom to give 100 Gm. of glucose by mouth with each dose of Lipo-adrenal cortex extract, because one of its functions is to aid in the deposition of liver glycogen. With the patient in coma this is given intravenously.

For the patients with cirrhosis, Lipo-adrenal cortex extract is given in conjunction with a nutritious diet (the Patek high-protein, high-carbohydrate diet) and additional supplies of B complex vitamins and lipotropic substances. We feel that Lipo-adrenal cortex extract has good adjunctive value, but not specific value, so that the other tried and effective remedies must be given in addition.

In the patients with cirrhosis of the liver and with acute hepatitis, 2 cc. of Lipo-adrenal cortex extract was given three times a week, along with 100 Gm. of glucose by mouth with each dose. The results in patients with cirrhosis of the liver were far better than those attained with dietary and vitamin therapy as determined in each individual case. As in the case with testosterone therapy, it was difficult to obtain control cases to be observed alongside treated cases. The very nature of the pathology of cirrhosis of the liver precludes the finding of alternate patients with the same degree of pathology.

The patients with acute hepatitis reponded very well to the same dosage of Lipo-adrenal cortex extract as given to patients with cirrhosis. The results seemed quite dramatic in several patients.

We also thought it of interest to see if "replacement" doses of cortisone would be equally effective in liver disease.[18] The "replacement" dose of cortisone could be arbitrarily taken to be the amount that would be suggested for treatment in a patient with Addison's disease.[19] This has been stated to be about 25 mg. daily. This small daily dose of cortisone proved to be of substantial benefit to patients with severe viral hepatitis. There were no side effects whatever in any of these patients. The reduction in liver size, liver tenderness and the reduction of certain chemical values in the blood, such as the icterus index and total bilirubin level, were dramatic.

We have recently treated successfully several patients with severe cirrhosis of the liver with small doses of cortisone (25 mg. and later 12.5 mg. daily). These patients had reached unsatisfactory stationary levels of recovery with dietary-vitamin-lipotropic therapy. Cortisone therapy resulted in a very definite increment of improvement. These patients will be reported elsewhere.

We would like to stress again that the dosage of cortisone used was the small, "replacement" dose. By "replacement" therapy we mean the use of just enough hormone to make up for the deficient amounts in the body. The doses of ACTH and cortisone that are used in clinical medicine today are of an entirely different order. The large doses of steroids that are given or the large doses that are formed in the body by ACTH action, require a large amount of work by the liver in the process of

detoxification. This would hardly seem to be a useful procedure for a liver already damaged. This pattern of dosage seems to be effective in certain other diseases, especially those on a hypersensitivity basis (using the term, in the broad sense).

In the patients with cirrhosis of the liver, it must be remembered that there are several other factors acting in ascitic fluid production such as lowered serum albumin, increased portal pressure because of hepatic lobular disruption, increased blood volume and, finally, decreased urinary output. The increased portal pressure is certainly an important cause, which cannot possibly be influenced by adrenocortical hormones. Thus all the other "tried and true" methods that have been found to be of value in the treatment of cirrhosis of the liver should be used in conjunction with hormone therapy. These include low salt diet, mercurial diuretics, and cation exchange resins when indicated.

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Essential Nutrition in Geriatrics

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NEW YORK, N. Y.

It is in geriatrics that physicians are mostly brought face to face with medicine's greatest unsolved problem, that of the degenerative diseases in elderly patients. While infectious diseases may be said to have been basically conquered and while as a result the average life expectancy has been raised to 65 years, two painful facts remain: (A.) To judge by such figures as those of rejections for military service in World War II (50 per cent unfit for armed services), the average health of the population is becoming worse rather than better. (B.) The incidence of degenerative diseases is increasing by leaps and bounds.

Are we prolonging men's lives only to leave them at the mercy of cancer, arteriosclerosis, liver disease, arthritis, and heart disease? Can these and similar diseases be averted by preventive treatment, or even relieved after they have developed?

While the average physician today regards diet as a secondary factor in the treatment and prevention of these degenerative diseases, the author believes that a study of the findings of biochemists will show that a large share of this type of disease is the end result of prolonged malnutrition and can be averted by early adoption of an adequate diet.

Is our present diet so defective that the wealthiest and most bountifully fed people in the world are actually starving in the midst of plenty? The United States Plant, Soil, and Nutrition Laboratory at Cornell has pointed out that some of the principal truck- and fruit-growing regions of our eastern seaboard are so deficient in essential minerals that the actual nutritive content of the "protective" foods which they supply to our great cities may be questionable.

In 1840, 1 oz. of genuine whole wheat bread made of stone-ground wheat contained 20 units of vitamin B-1. In 1950, 1 oz. of white bread contained only 5 units of B-1 before the addition of synthetic thiamine. The Food and Nutrition Board of the National Research Council considers an intake of 1.5 to 2 mg. (445–660 IU) of B-1 per day as necessary for maintenance of good health.

The refinement of white bread has removed not only vitamin B-1 but other known and unknown dietary factors such as proteins, other parts of the B-complex, vitamin E and essential minerals. There has been added to what is called "enriched" bread only synthetic B-1, riboflavin, niacin, and iron. This is replacing only a part of

the whole and cannot be expected to give the complete nutritional protection as the natural whole grain bread. Other grain food and cereals including polished rice are subjected to similar drastic processing.

Doctors Williams and Spies, who studied diets in various parts of the United States, state in their book, *Vitamin B-1*, published in 1938, that there is much sameness in diets all over the country. This sameness is largely in the enormous consumption of nonvitamin, nonmineral foods composed of white flour and white sugar. The average diet furnishes a vitamin B-1 intake of from 200-300 IU, which is just enough to prevent beriberi and pellagra. To have the optimum benefit from vitamin B-1, a person of 150 lbs. weight should have a daily intake of 750-1,000 IU.

The presence of mouth, teeth, and gum diseases in school children and adults needs no confirmation by laboratory test of the fact that nutritional deficiency is universal in civilized countries. It is also obvious that this condition does not improve with age. Doctor Alice Bernheim[1] has shown that the average person's usual diet, being composed of refined foods, does not contain the needed amount of calcium. This deficiency is universal in all civilized countries. The figures from the Food and Drug Journal, which keeps an accurate record of the export and import of food products into New York City, showed that the food intake of the population measured only 25 per cent for the vitamin- and mineral-containing protective foods as against 75 per cent of devitaminized foods composed of white flour and white sugar.

If such depleted diets continue over a period of years the body will develop tissue changes that will inevitably lead to degenerative diseases.

What good nutrition can accomplish is shown in a report by Dr. Robert McCarrison.[2] In 1918, speaking of the Hunza people in India, he writes: "My own personal experience provides an example of a race unsurpassed in perfection of physique and in freedom from diseases in general. Amongst these people the span of life is extraordinarily long; and such services as I was able to render them during the seven years I spent in their midst were confined chiefly to the treatment of accidental lesions, the removal of senile cataract, plastic operations for granular eyelids, or the treatment of maladies wholly unconnected with food supply. These people are long-lived, vigorous in youth and age, capable of great endurance and enjoy a remarkable freedom from disease in general. . . . During the period of my association with these people, I never saw a case of asthenic dyspepsia, of gastric or duodenal ulcer, appendicitis, mucous colitis, or of cancer."

Later, McCarrison made experiments in which rats were given the type of diet eaten by the Hunza people. This consisted of chapattis, or flat bread, made of whole meal wheat flour lightly smeared with butter, sprouted pulses or legumes, fresh, raw carrots and fresh, raw cabbage *ad libitum*, unpasteurized whole milk and soured milk, a small ration of meat with bones once a week, and an abundance of water. This food was grown on special soil prepared with organic fertilizers. No chemical fertilizers, insecticides or pesticide sprays have ever been used on the soil.

In this experiment 1,189 rats were watched from birth to the twenty-seventh month, an age in the rat which corresponds to that of about 55 years in man. His report states: "During the past two and a quarter years there has been no case of

illness in this 'universe' of albino rats, no deaths from natural causes in the adult stock, and but for a few accidental deaths, no infantile mortality. Both clinically and at post mortem examinations this stock has been shown to be remarkably free from disease."

McCarrison then took the customary inadequate diet of the poorer peoples of Bengal and Madras, consisting of polished rice, pulses or legumes, vegetables, condiments, and a little milk. He fed 2,243 rats on this diet and they developed all the diseases suffered by these people. They got diseases of every organ of the body, eyes, nose, ears, lungs, heart, stomach, intestines, kidneys, bladder, reproductive organs, blood, special glands, and nerves.

Later, McCarrison gave a set of rats the diet of the poorer classes in England, consisting of white bread, margarine, sweetened tea, boiled vegetables, white sugar, tinned meats and jams. He reports: "On this diet, not only did the rats grow badly but they developed what one might call rat-neurasthenia. They were nervous and apt to bite their attendants, they lived unhappily together and by the sixteenth day, they began to kill each other and eat the weaker ones amongst them." Because of this cannibalism in the rats, the experiment was discontinued.

This report shows the effect of various diets on experimental animals and humans. It reveals that foods grown on properly prepared soil, so that they contain adequate vitamins and minerals as well as complete proteins, will prevent degenerative diseases. The question then arises whether we can do anything to correct the pathologic changes once they have developed. Recent experimental and clinical work shows that it is possible to control and retard some of these conditions and to prolong the life of the patient. This is true of liver dysfunction and its associated arteriosclerosis, hypercholesterolemia, and coronary disease. These conditions and many allied diseases of the human organism are recognized as being due to dietary deficiency, especially of the lipotropic factors, B-complex, and an excess intake of fat.

Morrison[3] reviewed evidence that arteriosclerosis is a metabolic error and not the inevitable accompaniment of advancing age, and that it may be preventable. He maintained that arteriosclerosis develops through a triad based on (a) high cholesterol-high fat diet; (b) malfunction of the liver, involving disturbances in lipid and lipoprotein metabolism; and (c) deficiencies and imbalances in endocrine function implicating the thyroid and sex hormones. He advised a program of low fat, low cholesterol diet and lipotropic therapy, choline, inositol combination and where indicated, estrogen and androgen hormones for coronary artery disease. Under this treatment mortality was reduced to one third, angina pains decreased or disappeared, and patients returned to work or normal activities with a feeling of well-being, optimism, and better morale.

Doctor Boris Sokoloff[4] states that not long ago it was believed that longevity of an animal or man is determined chiefly by heredity, but now scientists are placing greater emphasis on nutrition as a paramount factor in the prolongation of life in man and animal alike. The results of McCarrison's experiments showing that diet influenced the life span of man and rats has been dramatically confirmed recently by

C. McCay and M. Crowell[5] of Cornell University. They were able to double the normal span of life in rats by keeping them from birth on a low calory diet rich in vitamins. In other words diets high in protective foods and low in refined foods, depleted of their nutrient factors, improves the health and prolongs the life span.

Henry C. Sherman[6] believes that "old age can be deferred and man's life span lengthened." He further states: "The indicated improvement of the adult life expectation from 70 to 77 years is apparently well within the scientific probabilities for those who use the newer knowledge of nutrition in their daily food habits, beginning early enough in life. It is not merely a longer lease of life that is offered, but a life cycle both longer and lived on a higher plane of positive health, efficiency, and happiness throughout." Sherman stated many times that the larger the percentage of total calories in the form of protective foods, the smaller was the percentage of failure in the preservation of the characteristics of youth.

It is then apparent that when we learn to eat day after day, month after month, year after year all the essential nutrients, a higher degree of health will result and there will be a marked decrease in the degenerative diseases, and a prolonged, healthy life span will follow. Progress of the science of nutrition and growing knowledge of vitamins, minerals, and enzymes places the physician in possession of facts that enable him to prevent and control the ever-increasing danger of degenerative diseases in geriatric patients.

Food intake should be based on what materials the body needs for its health and efficient function rather than on present-day perverted taste habits. The diet should be low in carbohydrate, low in fat, high in proteins, and high in foods that contain natural vitamins and minerals, such as whole grain products in the form of bread and cereal, fruit and fresh vegetables, and the intake of refined foods and sugars must be restricted or eliminated. Albrecht[7] states: "We are constantly in danger of deficiencies of proteins and minerals relative to carbohydrates and fats." This he believes results in lowered powers of growth and lowered capacity for reproduction. He also states: "Life is not passed from one fat globule to another, nor from one starch grain to another, but only from one protein to another protein molecule. Proteins are the foods that rebuild the body, carry life and guarantee reproduction."

There is need for a better understanding of how to choose a diet which will contain the factors essential to good health.

1. Delete from the diet any food which has the basic chemistry altered by the removal of those elements essential to human nutrition.

2. Do not depend on "enriched" or fortified foods. These foods replace only a small fraction of the vitamins and minerals removed in the process of refining

3. The diet should be high in protective foods. These include fresh fruits, vegetables, and dairy products, whole grain bread, and cereals. A large portion of the

fruits and vegetables should be eaten in the fresh raw state to assure an adequate intake of the important heat labile enzymes.

4. Daily intake of lean meat, fish, fowl, and eggs.

5. Daily intake of milk and dairy products. Whole unpasteurized milk is preferable.

6. Adequate intake of fresh fruits.

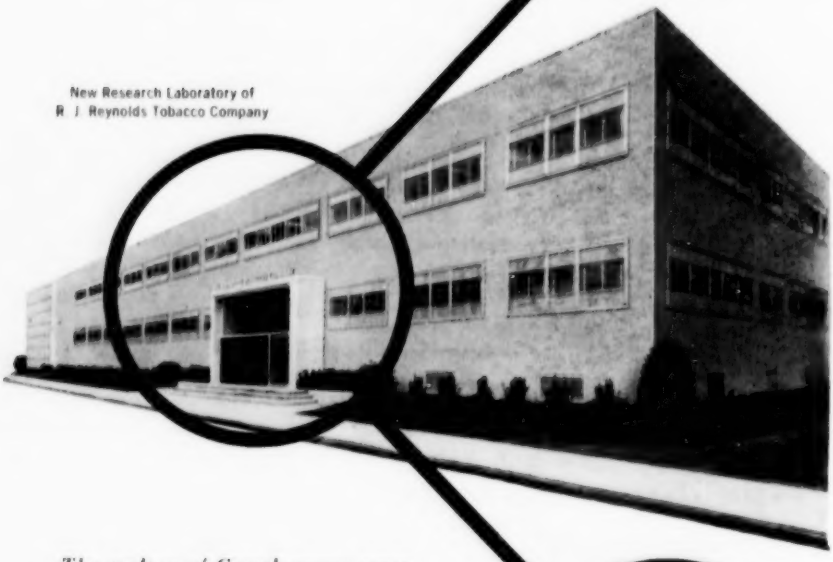
7. For adequate intake of important B-complex factors, the diets of geriatric patients should be supplemented with a good natural source of these elements, such as (1) desiccated whole liver. This substance contains not only all the known and identified fractions of the B-complex but a number of unidentified substances that are at least as important to nutrition as those already known. It also contains the antifatigue factor which is so important in elderly people. (2) Brewers yeast, which is probably the cheapest source of the natural B-complex and is also high in complete proteins. (3) Wheat germ is another excellent source of the whole natural B-complex and also rich in Vitamin E.

8. The above diet should supply sufficient vitamin A and D, but if there is a doubt supplement it with a preparation of aqueous natural A and D for better absorption.

9. Organically grown foods are advisable when available for consumption. Organic foods have 20-40 per cent greater vitamin and trace mineral content than those grown in depleted soils. They are also free from chemical insecticides and pesticides which accumulate in human fat and produce liver damage. For optimum health this type of food is essential. Organically grown foods contain many unknown protective elements that have not yet been identified. Many feeding tests in humans and animals have proved this fact. If this type of food is not available, a vitamin and mineral supplement is recommended.

In conclusion the diet must be optimum in its protein, vitamin, mineral, enzyme content to assure optimum health, protect against degenerative diseases, and prolong the life span.

PROGRESS THROUGH RESEARCH



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INCORPORATING INTERNATIONAL RECORD OF OPHTHALMOLOGY

FOREWORD

The objective of the QUARTERLY REVIEW OF OPHTHALMOLOGY is to bring together in one publication concise but authoritative abstracts of current articles on ophthalmology, according to an all inclusive plan which includes all special, state, and national journals as well as the bulletins of clinics, hospitals, etc., and the transactions of meetings. This embraces both the domestic and foreign literature.

To assist the reader to locate quickly the articles of current interest all data are classified and published according to the following systematic plan:

Anatomy, Embryology, Heredity, Development and Nutrition

Optics, Physiology and Psychology of Vision

Physiology, Chemistry and Biochemistry of the Eye

Pathology, Bacteriology and Immunology

Diagnostic Methods of Examination Biomicroscopy and Photography

Ocular Movements and Motor Anomalies, Nystagmus, Reading Disability

Anomalies of Refraction and Accommodation, Contact Lenses

Conjunctiva

Cornea, Sclera and Tenon's Capsule

Anterior Chamber and Pupil

Uveal Tract and Sympathetic Ophthalmitis

Crystalline Lens

Vitreous Humor

Retina

Neuro-Ophthalmology, Optic Nerve, Visual Pathways, Centers and Visual Fields

Eyeballs, Exophthalmos and Enophthalmos

Glaucoma and Hypotony

Lacrimal Apparatus

Eyelids

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Comparative Ophthalmology

Tropical Ophthalmology

Hygiene, Prophylaxis, Occupational Ophthalmology and Injuries

Illumination and Illuminating Engineering

Ophthalmic Sociology

Education, History and Institutions

Miscellaneous

Book Reviews

Announcements

A section entitled International Record of Ophthalmology is included at the beginning of the journal. The Record Section consists of advanced clinical and experimental reports.

WIDE

APPLICATION

IN

OPHTHALMOLOGY

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because of its dependable
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For rapid relief of congestion, itching, smarting and lacrimation.

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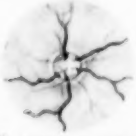

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Quarterly Review of **OPHTHALMOLOGY**

ABSTRACTS

OPTICS, PHYSIOLOGY AND PSYCHOLOGY OF VISION

47. *Psychological Factors in Visual Acuity.* GLENN A. FRY, Columbus, Ohio. Am. J. Optom. & Arch. Am. Acad. Optom. *29*:624–630, December 1952.

There are at least three types of psychologic factors affecting visual acuity which can be segregated and studied independently: (1) interpretation of blurred retinal images; (2) changes in sharpness of the retinal image resulting from an effort to see; (3) changes in intraocular pressure associated with an effort to see.

The third factor becomes manifest in connection with the study of afterimages. The second factor becomes manifest in experiments on intermittent visibility where effects of voluntary control and practice can be demonstrated. The last two factors can be separated from the first by using targets which require detection rather than recognition.—*Author's abstract.*

48. *Interocular Transfer of After-Images.* GORDON L. WALLS, Berkeley, California. Am. J. Optom. & Arch. Am. Acad. Optom. *30*:57–64, February 1953.

The history of the supposed transferability of afterimages from a stimulated eye to a nonstimulated eye is briefly reviewed. It is shown that most such situations are ambiguous, since the afterimage is visible with both eyes closed, or in the dark, so that it may be the stimulated eye which "sees" the aftereffect even when this eye is closed and the other is open. It is pointed out that when such a moving stimulus as a rotating spiral is presented in monocular photopia, the negative aftereffect is not visible with closed eyes etc., but seen only as an altered appearance of some new stimulus. Since it is obtainable via either eye singly, the effect is genuinely transferable. It is also shown that if one (either) hemiretina of one eye receives the image of the spiral, the other eye's field contains the aftereffect only in its homonomous half. The transfer of aftereffect is therefore not interocular but intra-

cortical. It can occur only within one hemisphere, between cortical representations of the two hemiretinas which project to that hemisphere. It has not yet been determined whether nasal-to-temporal and temporal-to-nasal transferabilities are equal. —*Author's abstract.*

49. *Space-Eikonometry in Aniseikonia.* ROBERT E. BANNON, Southbridge, Mass. Am. J. Optom. & Arch. Am. Acad. Optom. *30*:86–98, February 1953.

Instruments for measuring differences in the relative size of the ocular images (aniseikonia) were devised by Ames and his colleagues at Dartmouth College beginning in 1928.

It was recognized in the early researches that even small amounts (1 per cent or less) of these relative size differences (disparities) could be detected by their influence upon space perception. Following the clinical use of instrumentation, which measured the *linear* difference in the relative size of the ocular images, the Space Eikonometer was developed which measures size differences indirectly, that is, by the effect such binocular disparities have on the subjective appearance of an appropriate target. An illustrated description of the new instrument and its operation is given.

The discomfort reported by patients with small differences in ocular image size may be due, in part, to the many fine exacting neuromuscular adjustments necessary to see singly and efficiently. This burden upon the fusion faculty may account for some symptoms but it is also likely that besides physiologic factors, there are psychosomatic aspects which need further exploration.

As a refinement of refractive procedure, the routine measurement of aniseikonia depends not only upon available instrumentation and correcting lenses, but also upon the knowledge and interest of ophthalmic practitioners who are eager to render their patients the ultimate in efficient and comfortable vision. *Author's abstract.*

50. *A Note on Color Vision.* JOSEPH I. PASCAL, New York, N. Y. Am. J. Optom. & Arch. Am. Acad. Optom. *30*:38–40, January 1953.

Each of the three qualities of a color has an objective phase and a subjective counterpart. These are as generally given: wave length and hue; purity and saturation; luminance and brightness. The wave length and hue concept is only a convenient way of expressing this relation, since fundamentally it is the difference in wave (vibration) frequency which determines the hue and not the difference in wave length.

When light travels in optically dense media, it is slowed down in accordance with the index of refraction of the medium. But the slowing down is a result of the shortening of the wave length and not because of a change in vibration frequency. The frequency is the more fundamental of the two and remains the same in all media. Thus, a "red" disc will appear red whether seen in air or with the eye under water, because the vibration frequency has remained the same, though the wave has shortened. Therefore, the work of Granit and others, who studied

the action currents of single nerve fibers in an eye from which the ocular media have been removed, is applicable to the living eye with the ocular media intact.—*Author's abstract.*

PATHOLOGY, BACTERIOLOGY AND IMMUNOLOGY

51. *The Isolation of a Virus as the Cause of Behçet's Disease.* NECDET SEZER. Am. J. Ophth. 3:301-15, March 1953.

In 1937, Behçet, a Turkish dermatologist, first identified as a distinct entity a disease presenting the three cardinal symptoms of iridocyclitis with hypopyon, aphthous lesions in the mouth, and ulceration of the genitalia. Behçet suggested that this syndrome was an independent, morbid entity caused by a specific agent, very probably a virus. Later various writers accepted Behçet's hypothesis, while others continued to be sceptical. Behçet and those who believed in a viral etiology were unsuccessful in their attempts to isolate the pathologic agent, and thus were obliged themselves to remain speculative. The cause of their failure appears now to have been the limitation of their investigations to the fluid in the anterior chamber and the exudate of the aphthae formed on the genitalia and in the mouth. Necdet Sezer's studies within these limits were equally unsuccessful. Only when his investigations were extended to the exudate collected from under the retina and from the vitreous body was it possible to isolate a virus. According to these findings, the pathologic agent of the disease apparently resides in the posterior segment of the eye and is probably absent from the mouth and genital organs as well as from the hypopyon.

The isolation of the pathologic agent from each of the three patients by the same method, and the development of exactly the same cultural and serologic properties in all three instances, would certainly seem to indicate that the disease in all three cases was caused by a common virus. A strongly positive reaction obtained with the virus in complement-fixation and neutralization tests with the blood sera of 12 patients suffering from the disease, and the absence of any reaction with normal human or animal sera, is considered corroborative evidence that the antigen discovered is the specific agent of this disease. The virus caused manifestations in the eyes of rabbits almost like those in men, and in some cases resulted in encephalitis and cutaneous symptoms. It was also of interest in the experiments on mice that, in addition to encephalitis, cutaneous manifestations and signs of thrombophlebitis in the legs were of the same nature as those observed in some human patients.

Sezer's studies would thus seem to confirm the supposition that this syndrome, with its three cardinal symptoms, is indeed an independent disease, and to establish its causative agent as a filtrable, neurotropic, virus, with specific characteristics, first isolated in the course of these studies.

DIAGNOSTIC METHODS OF EXAMINATION, BIOMICROSCOPY AND PHOTOGRAPHY

52. A *Quantitative System of Dynamic Skiametry.* EDWIN FORBES TAIT, Norristown, Pennsylvania. Am. J. Optom. & Arch. Am. Acad. Optom. *30*:113–129, March 1953.

This paper was originally presented in 1928, but, upon request, was rewritten in the light of more recent work. The author reviews the important advances and contributions in the field and describes and gives the results of his own research.

An investigation of the lag of accommodation in 712 cases showed that the average value of the lag, as found by the comparison of the dynamic and static skiametric findings, was 1.12 D. for all cases, but .75 D. in the 20–25 year old group. It was found to vary greatly in the experimental group, however, and the variations were determined to be due to the different levels of accommodative response to stimuli from the fixed convergence.

A reciprocal relationship within certain limits between the accommodative-convergence and the convergence-accommodation reflexes was noted and made the subject for a later investigation which determined a co-efficient of correlation between the two reflexes of $+0.73 \pm .014$.

Inasmuch as the basic difficulty in the interpretation of the instrumental findings in dynamic skiametry is that of estimating the accommodation in use during the test, this reciprocal relationship between the accommodative-convergence reflex and the convergence-accommodation reflexes is made use of in determining the allowance for accommodation in the actual clinical procedure.

A definite method is presented for the technic and interpretation of the dynamic skiametric test, utilizing the preceding concepts, and is reported to be thoroughly practical when applied to a large group of clinic patients. This method requires single binocular vision, fixation upon suitable charts on the skiascope, and "fogging," the latter to eliminate all accommodative activity except that due to the fixation convergence. The results are then interpreted in terms of the amount of accommodative-convergence at the fixation point and a deduction from the gross skiametric findings made according to a table. The net result, after such deduction, will be a very close approximation to the proper distance lens correction in the majority of cases and suggests the proper diagnosis in the remainder.—*Author's abstract.*

53. *Targets and Testing Procedures for The Measurement of Visual Acuity.* GLENN A. FRY, Columbus, Ohio. Am. J. Optom. & Arch. Am. Acad. Optom. *30*:22–37, January 1953.

Visual acuity without glasses is measured primarily for the purpose of detecting spherical and astigmatic errors of refraction. One can depend upon blur circle theory and use a photographic method for a qualitative demonstration of the rôle played by these errors of refraction. Special attention is paid to the supernumerary effects produced by overlapping blur circles and several methods are suggested for overcoming this difficulty. The factors determining the choice between

a method of limits and a method of constant stimuli are discussed. Also discussed is the significance of the difference between targets requiring recognition and those that require all-or-none detection of the presence of a gap, line, or point. In the case of an astigmatic eye, it is possible to design targets to obtain separate measures for the visual acuity for the two principal meridians or an average value, and also the locations of the principal meridians. —*Author's abstract.*

54. *Gonioscopy in The Diagnosis of Tumors of The Iris and Ciliary Body (Emphasis on Intra-Epithelial Cysts).* HAROLD G. SCHEIE, Philadelphia, Pennsylvania. Abstract of a paper presented at the Eighty-ninth Annual Meeting of the American Ophthalmological Society, Hot Springs, Va., May 28th–30th, 1953.

Gonioscopy may permit, when impossible by any other method of examination, visualization and accurate diagnosis of tumors of the posterior chamber. No previous mention has been found in the literature that the extreme periphery of the posterior chamber of many eyes can be seen by gonioscopic examination when the pupils are widely dilated. Three to four instillations of neosynephrine 10 per cent and homatropine bromide 4 per cent at 20 minute intervals are usually necessary. The pupillary border then may retract sufficiently to leave a space between it and the lens, through which the periphery of the posterior chamber can be seen gonioscopically. The anterior portions of the ciliary processes and the extreme periphery of the lens become visible, as well as very small tumors of this area.

The presence of a tumor in the posterior chamber is suggested by a bulge of the periphery of the iris. The lesion most frequently responsible, in the author's experience, is intraepithelial cyst of the periphery of the iris or anterior portion of the ciliary body. Other lesions include any neoplasm or inflammatory mass which may arise from the ciliary body or the posterior surface of the iris. If the lesion should infiltrate by way of the root of the iris into the angle of the anterior chamber, or become sufficiently large to protrude into the pupillary space, they become visible to slit lamp examination, and gonioscopic study is of less value.

The value of gonioscopic examination in the diagnosis of intraepithelial cysts of the iris and ciliary body is supported by the following observations based on 20 eyes of 16 patients. The presence of a tumor behind the iris was suggested by a bulge of the periphery of the iris seen on routine slit lamp examination in 17 eyes. In two of the eyes the cysts were discovered through operative colobomas of the iris during gonioscopic examination, and in the other eye multiple cysts were discovered upon routine gonioscopic examination after finding a similar condition in the fellow eye. Gonioscopic examination definitely established the diagnosis in 18 of these eyes and supported the diagnosis in 2 others. The diagnosis could have been made by slit lamp examination in 3 eyes, two where the cysts projected into the pupillary space with the pupil dilated, and another where a cyst of considerable size was visible through an operative coloboma of the iris.

A relatively high incidence of intraepithelial cysts of the iris and ciliary body and the frequency of multiple cysts were emphasized in the paper. The most likely

theory of origin was thought to be that of Vail, who suggested that these cysts develop in the valleys between the ciliary processes as a result of traction of the zonule of Zinn on the inner epithelial layer.—*Author's abstract.*

55. *The Electric Tonometer.* SAMUEL I. ASKOVITZ. Am. J. Ophth. *36*:400–401, March 1953.

Instruments containing vacuum tubes may be highly sensitive to voltage fluctuations in their power supply. It was found that electronic tonometer readings could vary considerably with relatively minor changes in voltage. It is recommended that a proper constant-voltage transformer be applied, especially for tonography. 1 table.

OCULAR MOVEMENTS AND MOTOR ANOMALIES, NYSTAGMUS, READING DISABILITY

56. *Observations on Vertical Divergences and Hyperphorias.* KENNETH N. OGLE AND AVERY DE H. PRANGEN, Rochester, Minn. A.M.A. Arch. Ophth. *49*: 313–334, March 1953.

A study was made of hyperphorias, by means of the fixation disparity technic, while the eyes were forced into vertical divergences by prisms. Most subjects are able to compensate completely for vertical prism divergences certainly exceeding 6 △. Vertical prism vergences are still normal and symmetrical about the new positions of the eyes when the divergence is so compensated. However, it was found that, for these subjects the basic hyperphoria was maintained independent of the compensation. A certain group of patients with hyperphoria did not compensate for vertical prisms, but accepted those prisms in exactly the degree to which they were prescribed. It was shown that normally the eyes immediately compensate for vertical divergences required when the eyes fixate an obliquely located point on a near plane surface. This type of compensation was classed with that found in many subjects who wear anisometropic refractive corrections, in that the same effective hyperphoria is measured in all directions of gaze. Two components of the compulsion-to-fusion reflex are assumed to account for the compensatory phenomena: The first is psycho-optical; the second is involuntary, having two aspects, a rapid one encountered in clinical prism vergence tests and a slow one accounting for the complete compensation to vertical prism divergences. Consideration is given to the problem of why hyperphorias persist in spite of the ability of the eyes to compensate for large vertical divergences.

57. *A Clinical Study of Convergence Insufficiency.* DAVID D. MICHAELS, Chicago, Illinois. Am. J. Optom. & Arch. Am. Acad. Optom. *30*:65–72, February, 1953.

A preliminary report on a statistical analysis of convergence insufficiency is presented. The test findings which are believed to be influenced by this condition are

considered to be: near point of convergence (to objective diplopia); habitual phoria at distance and 16 inches; base out to break at distance and 16 inches. These test findings were statistically evaluated by comparing a group of 78 subjects to a normal control group of 42 cases. Three criteria were used in selecting the abnormal group: Remote NPC (beyond 4 inches); remote NPC (beyond 8 inches); high exophoria at near.

It is concluded that the three methods of diagnosis do not give comparable results and that the near point of convergence is probably the best indicator of convergence malfunction. It is suggested that lowered convergence ability is not as common as has been supposed and that it may represent a symptom of a more general visual condition.—*Author's abstract.*

ANOMALIES OF REFRACTION AND ACCOMMODATION, CONTACT LENS

58. *An Investigation of The Time Characteristics of Accommodation and Convergence.* MERRILL J. ALLEN, Columbus, Ohio. Am. J. Optom. & Arch. Am. Acad. Optom. *30*:78–83, February 1953.

This paper is a review of some of the studies made on the type and characteristics of the ciliary muscle and the over-all time characteristics of the accommodative act. References are cited on the anatomy, physiology, and the innervation of the ciliary muscle, its effect on the intraocular pressure, the amount of its pull, and its effect on the choroid; on the measurement of the speed of the accommodative response of the human eye by various subjective technics; on the measurement of the accommodative response by photographic technics; on the recording of the position of the eyes during changes in fixation and on the type and characteristics of the internal rectus muscle.—*Author's abstract.*

59. *Sex Differences in The Incidence of Various Grades of Myopia.* MONROE J. HIRSCH, Los Angeles, California. Am. J. Optom. & Arch. Am. Acad. Optom. *30*:135–138, March 1953.

The records of 5,201 patients at the clinic of the Los Angeles College of Optometry were analyzed to determine the incidence of myopia of various degrees among men and women, respectively. The average equivalent sphere was used as the measure of the ametropia. Among myopes of more than 6.00 diopters, there were more than twice as many women as there were men; while among the myopes of less than 6.00 diopters, there were only 8 women for every 10 men. This study confirms the classical view that high myopia is decidedly more prevalent among women than among men, while moderate myopia is slightly more frequent among men. The ratio of men to women for each degree of myopia shifts markedly at 6.00 D., offering clinical rationale for the custom of using this point as the dividing line between two different clinical types of myopia. The theoretic significance of these findings is briefly discussed.—*Author's abstract.*

UVEAL TRACT AND SYMPATHETIC OPHTHALMITIS

60. *Malignant Melanoma of the Eye.* ALBERT C. ESPOSITO, Huntington, West Virginia. West Virginia Med. J. 49:71–76. March, 1953.

Laennec, in 1819, first discussed and described these pigmented growths as "melanoses." Virchow, Von Graafe, Knapp, Fuchs, Masson, Martin-Jones, Parsons, and Reese discuss these growths and add much to our knowledge of these neoplasms. The historical background is also discussed.

Quoting Theobald, and others, the author feels that the neurogenic theory of origin of the melanoma is acceptable but mentions Reese's and Wolff's theories also.

The tumor occurs in 2 cases per 10,000 eye patients. According to Fuchs' notation, 85 per cent occur in the choroid, 9 per cent occur in the ciliary body, and 6 per cent in the iris. The tumor acts as a sarcoma in metastasizing by way of the blood stream generally. It is noted that the tumor metastasizes early and varies in pigment content or color. It is found rarely in the Negroid race and occurs more commonly in women.

Callender and Wilder's classification is given in detail and discussed. The malignancy varies per classification, per cell type, and pigment content. The prognosis is not influenced by the stage of growth at which the diagnosis is made. Forty-five to 48 per cent die within five years, while 60 per cent die within 10 years. Of interest, is the author's note that only 200 cases of malignant melanoma of the iris have been reported to date; 2 such cases have been included in this report.

The large differential diagnosis is given and discussed as is the present mode of treatment.

Eight of the author's cases are described in detail, 2 being in the iris, 1 of the ciliary body, and 5 of the choroid, with one being white and nonpigmented.

The author arrives at the following conclusions:

1. The cell, which is the precursor to this tumor, is evidently one of neurogenic origin.
2. The tumor is not common. It is found that 85 per cent occur in the choroid, 9 per cent in the ciliary body, and 6 per cent in the iris, with 200 such cases of tumor in the iris reported in the literature.
3. The tumor metastasizes by way of the blood stream, similar to sarcoma.
4. It occurs in older age groups, 40 years or over, and it is extremely rare in Negroes. In the iris, as noted by the 2 cases reported, it occurs at a much earlier age period, and more commonly in women.
5. The cells are spindle and epithelioid types.
6. The malignancy increases with the presence of epithelioid cells, with heavy pigment content, and with lessened fiber content.
7. In the over-all picture, covering a 10 year period, 60 per cent to 66 per cent, or approximately $\frac{2}{3}$ of all patients, died of metastasis.

Efforts must be directed towards early detection, diagnosis, and treatment in order to lower the high mortality rate of this particular malignancy. 18 references. —*Author's abstract.*

CRYSTALLINE LENS

61. *The Occurrence of Cystic Spaces in the Lens Simulating Cataract.* ALGERNON B. REESE AND JOSEPH A. C. WADSWORTH, New York. Abstract of an article given at the American Ophthalmological Society, Hot Springs, Va., May 28th–30th, 1953.

In about 10 per cent of all patients over 40 years of age, small cystlike spaces occur along the anterior and posterior border of the adult nucleus. With the ophthalmoscope these spaces are seen as small, oval, grayish lesions arranged in a symmetric fashion with the long axis concentric to the equator. With the slit lamp these spaces are optically empty but show some increase in density of the walls. The reduction of vision as a result of these spaces is very slight, unless posterior cortical changes are also present. Attempts have been made to identify these lens changes in microscopic preparation.—*Author's abstract.*

62. *Further Observations on Intraocular Acrylic Lenses in Cataract Surgery.* HAROLD RIDLEY, London, England. J. Internat. Coll. Surgeons *28*:325–33, December 1952.

Ordinary lens extraction does not complete the cure of cataract, for the missing portion of the eye is not replaced, and the refraction has to be adjusted by a powerful external glass which is heavy and unsightly. Such a glass has optical disadvantages causing unnatural magnification, distortion with oblique views, apparent displacement of objects, and limitation of the visual field. If the cataract is monocular, the two eyes cannot be focused simultaneously because of diplopia; furthermore, the patient frequently prefers to use the eye which has not undergone operation, even though it has lower acuity. This may cause the surgeon to advise postponement of operation for cataract which is more or less confined to one eye. However, if the cataractous lens is replaced by an artificial lenticulus, the two eyes are again partners and not rivals.

The intraocular acrylic lens is made of Transpex, pure polymethyl methacrylate. Its specific gravity is 1.19, about half that of glass and little more than aqueous fluid. Its diameter is 8.35 mm and thickness 2.4 mm, the refractive power within the eye is 24 D. A peripheral groove permits the lens to be grasped with forceps for insertion.

Extracapsular cataract extraction is performed, two corneo-scleral sutures being inserted. Great care is required for thorough removal of the anterior lens capsule with toothed forceps and of all cortical remnants by irrigation with normal saline. The lower edge of the intraocular acrylic lens is then placed behind the lower part of the iris and steadied in this position while the upper part of the iris is pulled upwards with a hook and over the upper edge of the lens. Final adjustments are made with iris repositors. After peripheral iridectomy, the wound is closed. The acrylic lens can be inserted in an eye which has previously undergone extracapsular extraction. Convalescence is of the same duration as with ordinary cataract oper-

ations, but the return of sight is somewhat slower on account of iritis, which causes a deposit on the front surface of the lens. This inflammation however clears and rarely recurs.

The lens is well tolerated and, provided the operation is technically satisfactory, a good result may be expected. More than half the cases see 20/30 or better and many read 20/20 or 20/15, some without a glass. The refraction is usually within 2 D. of that of the other eye so that binocular vision can be regained. The posterior capsule is kept stretched by the lens and does not appear to thicken in three years' experience. The longer the lens has been in the more satisfactory generally is the eye and the better its sight. The results of the first 47 intraocular acrylic lens operations are reported. (The author has now performed 100 such operations.) 2 references. 3 figures.—*Author's abstract.*

RETINA

63. *Statistical Study of Retinal Detachment.* R. W. ROBERTSON. Trans. Canad. Ophth. Soc. 5:122-137, 1952.

The postoperative follow-up of 138 cases of retinal detachment is presented. Males formed 55 per cent of all the cases. The average age was 45 years. The right eye was affected in 59 per cent of the cases. The percentage of cures fell inversely as the duration of the detachment. A history of trauma was given by 17 per cent of the patients. The failure rate was not affected by the refractive error; 49 per cent of the patients had a myopia of more than one diopter. Holes were most frequent in the upper temporal quadrants; cures were more frequent when one quadrant was detached, less frequent when two, three, or four quadrants were detached. In 86 per cent of the cures, retinal holes were found, in only 19 per cent of the failures were holes found. The obtaining of retinal fluid at operation did not affect the result. Repeat operations were successful in 56 per cent of cases. Aphakic eyes formed 8 per cent of the series; successful reapposition of the retina was obtained in 45 per cent of these. Scleral resection was successful in 1 of 4 cases. Complications included uveitis, removal of four eyeballs for possible tumor, glaucoma, vitreous hemorrhage and intercurrent medical illness. The overall cure of the retinal detachments was 55 per cent.

In selected cases, scleral resection as a primary operation might improve the chance of success. 14 figures. 9 refereaces.

64. *Central Retinal Vein Thrombosis.* J. VERNAL CASSADY, South Bend, Ind. Am. J. Ophth. *36*:331-335, March 1953.

In this article, the onset, course, progress, and outcome of 54 cases of central retinal vein thrombosis are reviewed. Physical or emotional trauma often are blamed for inciting retinal vein thrombosis, but arteriosclerosis, hypertension, diabetes, or a blood dyscrasia are the usual predisposing factors. The final visual acuity is dependent upon the extent and the degree of disturbance of the retinal metabolism. In 70 per cent of these cases either an arteriosclerosis of the retinal

vessels in the unaffected eye or an elevated blood pressure was found. There was no appreciable change for several months in the retina after the initial hemorrhages, papilledema, and exudates, but as the hemorrhages absorb, new capillaries are often seen not only on the affected optic disc, but also often on the disc of the unaffected eye. Either optic atrophy or perimacular degeneration or both were found in half of the cases as the hemorrhages absorbed.

Anticoagulant therapy was ineffective in altering the course of the disease. Eighty per cent of the cases became industrially blind, while only 20 per cent retained useful vision. After central retinal vein thrombosis occurs, there are only five or six years of life expectancy remaining. Treatment with vasodilators, anticoagulant therapy, or general systemic supportive management did not alter the ultimate poor prognosis except when the patients were young and had no hypertension.

In 16 per cent of these patients hemorrhagic glaucoma followed central retinal vein thrombosis within a few months. Pain from the high intraocular tension usually is so severe as to require enucleation, but at times the pain may subside even though the tension remains high. Enucleation is the treatment of choice for hemorrhagic glaucoma because of the danger of an associated intraocular tumor.

The prognosis of central retinal vein thrombosis is extremely grave and is in direct relationship to the age and hypertension of the patient. There is no effective treatment.—*Author's abstract.*

NEURO-OPHTHALMOLOGY, OPTIC NERVE, VISUAL PATHWAYS, CENTERS AND VISUAL FIELDS

65. *Severe Optic Neuritis In Infectious Mononucleosis.* THOMAS W. BONYNGE AND K. O. VONHAGEN. A.M.A. Arch. Neurol. & Psychiat. March 1953.

A case is reported in which infectious mononucleosis was complicated by involvement of the central nervous system causing optic neuritis with severe visual impairment. Dimercaprol (BAL) had been reported successfully used in treatment of severe peripheral neuropathies, and in one case of infectious mononucleosis with polyneuritis, remarkable improvement occurred as a result of dimercaprol injection. Accordingly, dimercaprol was employed in treatment of the patient with severe optic neuritis with apparent rapid improvement in visual acuity.

The present trend towards bizarre manifestations in infectious mononucleosis warrants cognizance of the possible efficacy of dimercaprol in treating some types of neuritis.—*Author's abstract.*

66. *Anomic Aphasia. Differential Diagnosis and Cerebral Localization of Lesion in Twenty Cases.* CARY SUTER, Charlottesville, Va. J.A.M.A. *151*:462–468. February 7, 1953.

The term anomic aphasia most clearly and correctly designates a form of speech disorder characterized by difficulty in recalling the names of people and things. Anomic aphasia is a major type of speech disorder standing between sensory apha-

sia, on the one hand, and motor aphasia, on the other, and arising from a defect in the associative processes necessary to language and not from any breakdown in sensory or motor functions. It is often confused with motor aphasia (in 50 per cent of the cases reported in this paper) and at times is misdiagnosed in other ways or overlooked altogether (in 30 per cent of the cases reported in this paper). This disorder can usually be diagnosed without difficulty if the examiner is aware of the importance and frequent occurrence of this type of aphasia, understands the main differences that set it apart from both sensory and motor aphasia, and uses a few simple tests in the examination of aphasia patients, especially the "object-naming test."

Anomic aphasia results when a cortical or subcortical lesion causes damage to a region of the dominant hemisphere in or near the angular gyrus. This area is made up specifically of the supramarginal gyrus, the angular gyrus, and the posterior part of the first, second, and third temporal gyri. A visual field defect, especially an incomplete right homonomous hemianopsia, is more often associated with anomic aphasia than any other neurologic finding (in 70 per cent of the cases reported in this paper). Every patient with anomic aphasia should have careful visual field studies. Other findings commonly associated with anomic aphasia include alexia, agraphia, amimia of right side of the face, apraxia or paresis of the right arm and hand, and right sided Jacksonian seizures. Patients with anomic aphasia, due to a damage from a vascular lesion, are less likely to show visual field defects or other neurologic findings, than are patients with anomic aphasia due to damage from an expanding intracranial lesion. 12 references. 4 figures. 3 tables.—*Author's abstract.*

GLAUCOMA AND HYPOTONY

67. *Nicotinic Acid in Glaucoma.* F. M. ZAVERUKHA. Vestn. Oftalm. *31*:31–35, 1952.

The use of nicotinic acid for improvement of vision in glaucoma was started in 1949. Since glaucoma is considered to be a disease of the vascular system, any therapeutic measure improving the circulation of the retinal vessels would be welcome. Because nicotinic acid can lead to increase of the intraocular tension by acting on the uveal vessels, it should be used with extreme caution and in small doses. It is contraindicated in acute, hemorrhagic, secondary glaucoma and in patients with chronic simple glaucoma in whom the intraocular tension is above 50 mg. of mercury. The method of using the nicotine acid was to establish the reaction of the eye to the drug. The function of the eye: visual acuity, visual fields, intraocular tension, fundus, and, in some cases, the tension of the retinal vessels was examined previous to the use of nicotinic acid. Intravenous injections of 0.3 mg. of 1 per cent of nicotinic acid were given every 15 minutes. In an hour the intraocular tension and visual acuity were measured. The test was considered positive if the tension was lowered and the visual acuity was higher. Intravenous injections of 3 mg. were given daily during 15 days to 27 patients. In 18 patients

the visual acuity was improved, in 6 patients it was unchanged, and in 3 it was worse. The author concludes that: (1) nicotinic acid improves the capillary blood circulation, increases the tissue metabolism, and thus stimulates the function of the peripheral receptor of the ocular analyser, i.e., it increases the function of central vision and also the peripheral vision. (2) Nicotinic acid should be used only in cases which give a positive reaction to the drug. Micro-doses should be used in conjunction with pilocarpin. (3) The course of 15 injections can be repeated.

68. *Glaucoma Following Occlusion of Central Retinal Artery.* CURTIS D. BENTON, Fort Lauderdale, Fla. A.M.A. Arch. Ophth. 49:280, March 1953.

Two cases are reported in which a sudden severe unilateral glaucoma developed four and one-half and ten weeks after occlusion of the central retinal artery in the affected eye. The intraocular tension was mensured as normal in the eye at the time of the vascular accident. The glaucoma was characterized by blindness and pain. The pupil was normal size or slightly dilated. Miotic therapy resulted in no prolonged reduction of intraocular tension. Small blood vessels became visible on the anterior surface of the iris. Gonioscopic study at this stage showed the filtration angle to be occluded by peripheral anterior synechia. Pathologic examination of one eye, that was enucleated, showed a fibrovascular membrane joining the iris root to the trabecular portion of the cornea.

It is felt that this rare type of glaucoma is a true secondary glaucoma, very similar to that which often follows occlusion of the central retinal vein. —*Author's abstract.*

69. *The Prevention of Blindness Due to Glaucoma.* RONALD E. PRINDLE, Sayre, Pa. Postgrad. Med. *13*:2 8, January 1953.

No other ocular disease may be more easily missed in a routine examination, or be more difficult to diagnose positively in its early stages, than simple or non-congestive glaucoma, yet failure or delay in diagnosis may result in irreversible visual loss.

The condition develops so insidiously that the patient may lose a considerable amount of peripheral vision before he develops symptoms sufficiently severe to bring him to a doctor. To aid in diagnosis, this paper presents a table of differential diagnosis, a table of symptomatology, and one of findings in the three stages of glaucoma. The diagnostic summary follows:

1. *Incidence:* One to two per cent of all ophthalmic patients have glaucoma. As far as is known, no one has made any estimates as to the number that might be encountered in an average general practice. Undoubtedly the percentage would be lower but still high enough to warrant its careful consideration in differential diagnosis.

2. *Age:* Since glaucoma is a condition of advancing years, usually developing after 40 to 45 years of age with an increasing incidence up to the seventies, persons in this age group need most careful ocular evaluations.

3. *Heredity:* There is a definite familial incidence and such cases may occur at an earlier age.

4. *Ocular discomfort:* Be suspicious of this symptom especially when it is associated with the use of eyes in reduced illumination, as tension is apt to be higher after exposure to dull illumination or darkness. Be suspicious of frequent or unsatisfactory change of correction. Be suspicious of diminished adaptability to darkness.

5. Inequality of pupils as regards size and reactions.

6. *Unilaterality:* Glaucoma is bilateral eventually but does not usually develop simultaneously in the two eyes. Although it is hoped the diagnosis will be made in its early stage, recognition of a well advanced glaucoma in one eye may save the other eye.

7. *Ophthalmoscopic examination:* Routine examination of the ocular fundus permits not only a diagnosis of glaucoma, but also a diagnosis of hypertension, diabetes, arteriosclerosis, nephritis, and the leukemias. While cupping is a late sign, it develops in degrees, not suddenly. Early signs of cupping are (a) a kinking of the vessels as they cross the disc, (b) a pushing or bunching of the vessels nasally, (c) the encroachment of the edge of a physiologic cup on the margin of the disc, and (d) a depression and a pallor of the temporal part of the disk indicating beginning atrophy.

8. *Perimetry:* Although refined perimetry requires an elaborate armamentarium, confrontation examinations can be made and gross visual field defects can be detected. This is best done by using a 5 to 7 mm. white test object rather than fingers. The apparent absence of defects does not rule out glaucoma, since the earliest scotomas are small pericentral defects that can be detected only by careful perimetric studies.

9. *Tonometry:* Although the widespread use of the tonometer is encouraged by others, the author feels its use should be limited to the specialist. Unless it is precisely done, the measurement is inaccurate. Because the tension may vary over a 24 hour period, it may be measured at a low point within normal limits and give one a false sense of security. Only if the technic is thoroughly understood and mastered and the diurnal fluctuation considered is it safe to utilize this diagnostic procedure. 4 references. 4 figures. 4 tables.—*Author's abstract.*

70. *Early Diagnosis of the Adult Primary Glaucomas.* H. SAUL SUGAR. Detroit, Mich. Eye, Ear, Nose and Throat Monthly. *32*:191–196. April 1953.

A diagnostic routine which may be useful in the diagnosis of early simple glaucoma consists of the history, ophthalmoscopy for the appearance of excavation of the discs, tonometry, perimetry, provocative tests, observations of the diurnal variation in the intraocular pressure, calculation of the resistance to aqueous outflow by tonography, and consideration of the ocular rigidity. In addition, gonioscopy may be helpful in ruling out a narrow angle mechanism. The provocative tests considered are the water test (considered the best), the lability test, a combined water and lability test, the anterior chamber puncture test, and the ocular compression

test. In considering tonometry, a series of cases is presented in which tonometric readings were taken with and without the patient voluntarily squeezing his lids together while the tonometer was resting on the cornea. These were correlated with readings on the Hertil exophthalmometer. The findings suggest that there is a greater tendency to pressure rise on squeezing the lids in the more prominent eyes. Tonography is considered important in diagnosis of early cases.

In acute glaucoma a diagnostic routine consists of the history, biomicroscopic observations of the anterior chamber depth and of the anterior segment as well as for evidence of previous acute congestive episodes, gonioscopy for determining the approximate width of the chamber angle, and to ascertain the presence or absence of peripheral anterior synechias; tonometry; and provocative tests. The provocative tests in acute glaucoma depend on methods of blocking the chamber angle by pupillary dilatation. The dark room test and careful mydriatic tests are discussed. —*Author's abstract.*

PHARMACOLOGY, TOXICOLOGY AND THERAPEUTICS

71. *Otrivin in Ophthalmology.* PAUL HURWITZ, Chicago, Ill. Eye, Ear, Nose and Throat Monthly. *32*:140–42, March 1953.

The topical effect of otrivin* solution, in 0.05 per cent and 0.025 per cent strength, was studied in the eyes of more than 100 patients. Included in this group were bacterial, vernal, and allergic conjunctivitis; phlyctenular and interstitial keratitis; ocular congestive states and epiphora. The results indicate that otrivin is an excellent ocular surface vasoconstrictor and decongestant. Its major indications, ophthalmologically, are in (1) epiphora of congestive or inflammatory origin; (2) photophobia of various etiologies; and (3) ocular hyperemia, where decongestion is desirable.

Thirty cases are tabulated. Of 13 patients with epiphora, 8 were relieved with otrivin instillations; of 14 cases of photophobia, 13 were improved. Other symptoms, such as smarting, burning, itching, and foreign body sensation, were alleviated. Blanching of the conjunctival vessels begins immediately following instillation and lasts several hours. 1 reference. 3 tables. —*Author's abstract.*

72. *Treatment of Allergic Diseases With Pyromen.* ALEXANDER WOLF AND H. S. HARTLEY. Eye, Ear, Nose & Throat Monthly. *32*:261, May 1953.

One gains the impression that additional studies are required to determine the dosage and the mode of administration of this drug for the treatment of allergic diseases. The present tendency is opposed to the intravenous route of administering pyromen to avoid febrile reactions. Dosages intradermally, subcutaneously, and sublingually may have an advantageous safety factor, though they may not give the therapeutic response obtainable with intravenously administered pyro-

* Otrivin is a member of the imidazoline series of chemical compounds, and is a product of Ciba Pharmaceutical Products, Inc., Summit, New Jersey.

men, with or without febrile reaction. Severe reactions in allergic patients are not without hazard, more especially in patients not under constant observation. The report of a fatality following the use of any drug should lead to extreme caution in its next issue.

73. *Experimental Hydrosulphosol Therapy of Thermol and Chemical Ocular Burns in Rabbits.* WILLIAM H. HAVENER, HAROLD F. FALLS, HARRY B. MCGEE, Ann Arbor, Michigan. Eye, Ear, Nose and Throat Monthly. *32*:201-202, April 1953.

Twenty rabbit corneas were burned thermally or chemically. Half were treated with hydrosulphosol, and half with castor oil as a control. There was no difference in the course of the burns with or without hydrosulphosol. References were cited to prove that hydrosulphosol promotes the growth of anaerobic bacteria, retards tissue culture growth, and does not promote healing in controlled clinical series of ocular burns. It is believed that hydrosulphosol not only is not beneficial, but may actually be hazardous to use in the treatment of corneal burns. 6 references.—*Author's abstract.*

74. *The Intravenous Use of ACTH in Optic Neuritis.* ERIC L. SMITH. Arch. Ophth. *49*:303, March 1953.

The current literature on the use of corticotropin intravenously is reviewed and summarized briefly. ACTH can best be administered in ½ to 2 liters of either normal saline or 5 per cent dextrose in water, which is run in intravenously over a period of 8 to 12 hours. Salt restriction and the addition of 0.2 per cent KCL to the solution is advisable. Blood pressure, weight, urinalysis, and eosinophile counts should be recorded at intervals (not necessarily daily). Twenty to twenty-five mg. ACTH appears to be the optimum daily dose, and prolonging the infusion time may be more effective than increasing the dosage beyond this. Treatment should be continued until the eosinophile count has been depressed to zero to fifty cells (0–50) per cu. mm., and continued three to eight days when a maximum response is usually attained. The intravenous route is definitely superior to, and also more physiologic, than the intramuscular route.

A woman, age 50, with bilateral optic neuritis, whose vision was reduced to L. P. in the right eye and to perception of hand movements in the left, first received oral doses of cortisone and chloromycetin for 13 days without appreciable improvement in vision. Then the intravenous administration of corticotropin was initiated and was maintained for the next two days in doses varying from 10 to 40 mg. in 1000 cc. of 5 per cent dextrose in water run in daily over an 8 hour period.

Marked improvement in vision occurred within two days following the eosinophile drop which occurred on the sixth day, and vision gradually improved to $20/20^{-2}$ in each eye. It is felt that the intravenous ACTH is undoubtedly a most valuable addition to the many other forms of therapy which may be used in the treatment of optic neuritis, and in some cases may be spectacularly successful.

MISCELLANEOUS

75. *Ocular Manifestations of Avitaminosis.* MORTON K. GREENSPOON, Sherman Oaks, California. Am. J. Optom. & Arch. Am. Acad. Optom. *30*:151–156, March 1953.

This paper is a review of the field of applied nutrition as related to the eye and vision. Studies have shown that the general symptoms complained of by most patients seeking an optical correction were much improved when a dietary correction was also suggested.

The effect of deficiencies of vitamins A, B_1, B_2, niacinamid, Vitamin D, calcium, and phosphorus on the eye are briefly discussed. Historical notes as to their discovery are presented.

Until recently, vitamin deficiency was considered a phenomenon observed in animals fed experimental diets, or a syndrome prevalent only in countries where choice of foods was extremely limited. At present, however, it is recognized that vitamin deficiencies are widespread in occurrence and that subclinical deficiencies which warrant specific dietary therapy with proper foods are still more prevalent. This paper has shown how these vitamin deficiencies affect the human eye and vision.—*Author's abstract.*

BOOK REVIEWS

The Ames Demonstrations in Perception. WILLIAM H. ITTELSON, Princeton, N. J. Princeton University Press, 1952. 88 pages.

This book presents descriptions of a number of pieces of apparatus that have been developed by Professor Adelbert A. Ames, Jr. and his co-workers in a study of visual perception. The summary of many demonstrations is given showing that the interpretation of things seen can be varied through physical changes in size, shape, distance, motion of object and observer, illumination, position in relation to other things of known size, previous experience of the observer, suggestion, and many other factors.

This collection should prove interesting and useful to serious workers in many fields—art and architecture, optics, mathematics, psychology, education, visual physiology, philosophy, and illumination, since they are collected in quite an orderly fashion starting with simple fundamentals such as the star point and line and continuing on through the effects of aniseikonia to the quite complicated demonstrations. The fundamental observations are usually interpreted alike by most people with normal vision while some of the latter are interpreted in various ways by different observers, and their interpretations of what is actually seen can be altered by psychic suggestion. Sufficient working drawings are provided so that anyone may construct similar apparatus and may apply it to various purposes.

The excellent bibliography is particularly valuable so that further information on any particular demonstration can be looked up.—*Wendell L. Hughes, M.D.*

Selected Studies in Visual Optics. JOSEPH I. PASCAL. St. Louis, Mo., 1952. C. V. Mosby Co., 800 pages. Price $12.50.

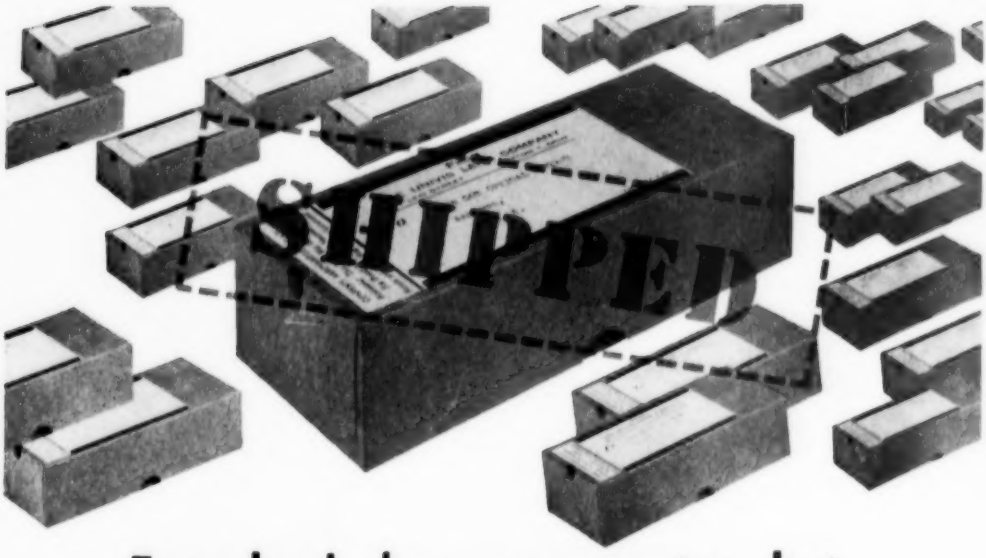
This is an unusual book in that it is devoted to filling in the gaps and making more understandable much of the theoretical material so frequently presented in other texts on refraction, optics, and allied subjects. It is a highly practical and functional book in which the various procedures for determining and interpreting the anomalies of vision are discussed concisely and clearly.

Pascal with his rich background accumulated in the course of some forty years of teaching presents information in a way that is easily grasped and absorbed by both students and practitioners. He also introduces a number of new ideas, methods, applications, simplified formulas, memory aids for things easily forgotten, schematic and graphic presentation of things that are otherwise but hazy ideas. As the title indicates, only selected topics in visual optics which the author felt needed clarification or a new interpretation have been included. It is evident that the author had in mind the average practitioner and student who wish to become more proficient in the clinical application of physiologic optics.

The first five chapters are concerned with lenses and prisms and their physical and optical properties. Chapters 6 and 7 discuss the physiologic and optical aspects of refraction while Chapters 29, 30, and 31 present many helpful points on the use of the Cross Cylinder Tests. Chapters 11 through 14 are devoted to retinoscopy, a nongeometric exposition of the optical theory, a review of the fundamentals of dynamic retinoscopy, principles and application of cylinder retinoscopy, and specialized technics in the practice of retinoscopy. There are two brief chapters (8 and 34) on orthoptics and vision training. It is not clear why these chapters, as well as other chapters on related subjects, are separated in the book. Other chapters—there are 46 in all—include such interesting and important matters as: Pascal's unique "Dam" formula which makes easy many otherwise complicated optical calculations; various aspects of lens effectivity; axes and angles of the eye; several notes and amplifications on geometric optics, image formation in the eye, reflection, refraction, thick lenses and lens combinations, lens forms, and optical oddities of contact lenses. In the field of binocular vision and ocular motility, there are meaty chapters on the mechanism and measurement of convergence, binocular duction tests and their significance, calculating stereoscopic vergence, a graphic study of the ocular muscles, and finally a most interesting presentation of a difficult subject, the charting of the diplopia field, made easy by Pascal's use of his "Benzene Ring Schema."

An appendix contains formulas and sign conventions, ophthalmic signs and symbols, a discussion on the difficulties caused by the use of the Greek alphabet, and German letters, comments upon the etymologic accuracy of certain terms, and a glossary of terms, symbols, and abbreviations. There are also 15 pages of up-to-date references from which the reader may further enrich his study.

The text is aided greatly by a large number of illustrations consisting of excellent diagrams, and drawings. It will prove to be a helpful reference book for practitioners, teachers and students.—*Robert E. Bannon.*



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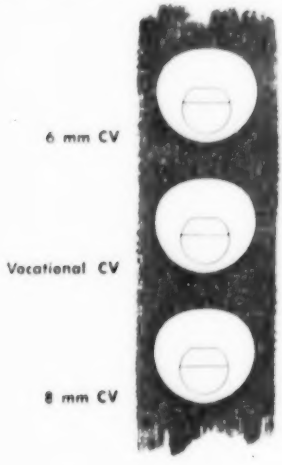

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